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Commentary

# Orthopedic surgery post COVID-19: an opportunity for innovation and transformation

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## From the Codman Shoulder Society

As the scale of the coronavirus pandemic continues to grow, so does the amount of uncertainty. This virus has upended life as we know it. And we, as surgeons, are not particularly good at dealing with uncertainty.<sup>11</sup> Although uncertainty is the norm in areas such as business forecasting and stock price valuations, we feel uneasy when grappling with tough questions, such as whether to cancel elective surgeries that are not immediately life-threatening but could result in more serious complications down the line. Take, for instance, cholecystectomy to remove symptomatic gallstones: failure to provide timely definitive treatment may increase the risk of potentially life-threatening pancreatitis.<sup>12</sup> How about delaying timely repair of an acute rotator cuff tear in a young patient, which likely could

impact the outcome? It can be hard to draw the line for what is critical, urgent, or nonurgent surgical care. Many questions remain unanswered.

But this crisis also presents value-maximizing opportunities for innovation in the delivery of health care, with orthopedic surgery as a particular segment presenting opportunity for value creation.

The current period of turbulence and fear may be a learning experience for providers, industry, and patients. It may promote collaboration and creative thinking that could spur changes in behavior. Such changes would potentially create value for all stakeholders.

Here, we would like to share our thoughts of some changes that may permanently impact orthopedic surgery going forward. We group these changes into 3 broad categories: (1) technology-aided replacement of in-person services with virtual ones, (2) a greater shift in surgeries from hospitals to surgery centers, and (3) increased pressure to be cost-conscious and to follow evidence-based medicine guidelines.

## Technology-aided replacement of in-person services with virtual ones

### Telehealth and virtual visits

This may represent perhaps the biggest example of change associated with the coronavirus outbreak. Initial telehealth-related concerns regarding insurance resistance, billing complexities, and privacy have evaporated as everyone is now striving to keep providers and patients separate. We believe that long-lagging telehealth is here to stay and will become the norm for orthopedic surgery. And there is early encouraging evidence of its use for postoperative visits after rotator cuff repair.<sup>4</sup> Even before this outbreak, our group was doing a study in collaboration with Harvard Business School looking at the safety and effectiveness of virtual visits during the 90-day post-acute care period following shoulder surgery. It was evident that most patients who underwent rotator cuff repair as well as shoulder arthroplasty simply did not need to return to the office during this period. In fact, we could easily see their surgical wound and instruct them how to self-examine themselves to alert us if there was an issue. Moreover, it was evident to us that this would free up office capacity, ultimately affecting the patient experience and cost-effectiveness of clinic utilization overall.

### Decreased utilization of formal physical therapy

There is little evidence that the amount of formal physical therapy after orthopedic surgery correlates with an improved ultimate recovery.<sup>8</sup> We believe that home-based physical therapy surrogates through digital tools will facilitate recovery for patients, increase compliance, and ultimately optimize costs and outcomes. Virtual coaching with feedback and videos uploaded to media-sharing platforms such as YouTube will reduce the need for as much hands-on physical therapy as we have come to expect. Moreover, some companies are creating new technology inclusive of wearable devices that interface with new computer monitoring programs to allow careful management of virtual recovery with physical therapy. One such example is PT Genie (<https://ptgenie.com>; Beachwood, OH, USA).

### Online tools for postoperative recovery

We and others are creating interactive modules either through third parties or through our own institutions that will concierge patients through their recovery. This may include apps and websites with interactive input that identify patients who need to return to the office and see a provider. Examples of such companies include myHealthTrack (<http://myhealthtrack.com>; San Diego, CA, USA) and PostopQRS (<https://www.postopqrs.com>; London, UK).

### Innovations in education: virtual and augmented reality training, digitalization of meetings and lectures

Given the cost of travel and the pressure to catch up with all the elective care that has been unmet after the pandemic, virtual educational alternatives will become more widespread. Remote conferencing services companies such as Zoom ([www.zoom.us](http://www.zoom.us); San Jose, CA, USA) have seen a sharp increase in their utilization and stock price during the first few months of 2020. Many organizations such as the American Academy of Orthopaedic Surgeons and American Shoulder and Elbow Surgeons may start offering more CME online virtual alternatives to meetings and travel. And educational organizations such as Vumedi ([www.vumedi.com](http://www.vumedi.com); Oakland, CA, USA) will also step up by offering more educational opportunities with strategic collaborations with industry and health care organizations. What is perhaps more exciting is the growing role that virtual and augmented reality training will have on resident and fellow education.<sup>6</sup> These technologies may not only reduce the cost of education for the salesforce of device companies but also improve surgeon engagement and customer acquisition. Examples include virtual surgical planning offered by many companies (eg, Blueprint, Wright Medical, Memphis, TN, USA; VIP, Arthrex, Naples, FL, USA) and virtual

reality training programs (eg, Precision OS, [www.precisionostech.com](http://www.precisionostech.com), Vancouver, Canada; Osso VR, [www.ossovr.com](http://www.ossovr.com), Palo Alto, CA, USA).

## Simplification and enhanced access to appointments

Patients may not want to wait for several weeks or months to see their provider after the outbreak. Services such as UberDoc (<https://uber-docs.com>; Boston, MA, USA) and Zocdoc (<https://www.zocdoc.com>; New York City, NY, USA) that facilitate direct access to available providers at transparent prices may gain momentum. Such networks source patients who have a need with doctors who have capacity.

## A greater shift in surgeries from hospitals to surgery centers

There is mounting evidence that ambulatory surgery centers can maximize the value of most orthopedic surgery procedures, including shoulder arthroplasty.<sup>1,2</sup> Following the outbreak, there will be such a backlog of cases in hospitals that many of them will get shifted to surgery centers. As surgeons get increasingly comfortable performing more procedures such as shoulder (or knee and hip) arthroplasty in surgery centers, they will want to keep doing them there. Patients are likely going to increasingly prefer a surgery center—where there are no coronavirus patients—to a hospital as well. Similarly, patients may be more motivated to go home after surgery, and avoid post-acute care facilities to minimize the risk of contracting the virus.

## Increased pressure to be cost-conscious and to follow evidence-based guidelines

### Increased cost pressure within hospitals

There will be more pressure to tightly manage costs within hospitals. This will initially be driven by the coronavirus. For instance, the stock prices of the 2 largest hospital chains in the United States, HCA and Tenet, declined by roughly twice as much as the S&P 500 from the end of 2019 through March 27, 2020. The \$100 billion that was allocated for hospitals as part of the \$2.2-trillion stimulus bill that was signed on March 27, 2020, only represents 1 month's worth of revenue for hospitals, and so if the coronavirus pandemic continues for more than a few months, it is unlikely to be sufficient to stem the financial losses experienced by hospitals. Even now in the midst of the crisis, some hospitals are already cutting back on the

compensation of their physicians and staff. Once we are through the coronavirus crisis, hospitals will likely continue to face financial pressure because of the migration of profitable orthopedic cases from hospitals to surgery centers.

In order to survive economically, hospitals will need to adopt more cost-conscious and effective practices. Identifying these practices will require the use of sophisticated clinical and operational analytics, and advanced cost measurement methodologies such as Time-Driven Activity-Based Costing.<sup>7</sup> One of the first targets will be orthopedic implant costs, given the wide variability and lack of transparency in their purchase prices across institutions.<sup>3</sup>

### Stricter adherence to evidence-based medicine

Much of what we do in orthopedic surgery is based more on anecdotal than empirical evidence. The considerable accumulation of cases after the outbreak may prompt stricter adherence to evidence-based practice guidelines as to whom to prioritize for surgery. This will create an opportunity to decrease unwarranted variation of orthopedic procedures that provide questionable value to certain patients (eg, arthroscopic partial meniscectomy for degenerative meniscal tears<sup>10</sup> and subacromial decompression for shoulder impingement).<sup>5</sup> However, it is important to note that rigid approaches to care that do not allow for any adaptation may pose barriers to innovation. Now actually may be a great time to innovate. Either fail fast or allow the patients to reap the benefits. Creative thinking will be needed to accelerate progress after this outbreak, and innovation is critical to creating future evidence.<sup>9</sup>

For too long, health care has been a nidus for inefficient use of time and resources. The future may not permit this in the United States any longer. No one knows exactly what will come of the coronavirus pandemic, but this was our best stab at some of the unexpected ways that orthopedic surgery may change for the good.

### Disclaimer

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